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What point on Earth is farthest from the Earth's center?

Program #3,132 of the Earth & Sky Radio Series
Hosts Deborah Byrd and Joel Block
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Radio Shows

DB: This is Earth and Sky with a question from Jenny Werner who goes to Lakeside Middle School in Georgia. She asks, "Where is the farthest point on Earth away from the center of the Earth?"

Nanotechnology

Edge of Discovery

JB: Jenny, the top of Mount Everest is the highest point above sea level. But Earth isn't a perfect sphere -- it bulges at the equator. The bulge is slight -- Earth's diameter is only about 21 kilometers greater at the equator than at the poles. Still, when talking about the farthest point from the center of Earth, this equatorial bulge gives mountains close to the equator an advantage.

Listener Questions

Observing Earth

DB: Consider that Mount Everest is nearly 9,000 meters above sea level -- but it's in Nepal, fairly far north of Earth's equator. Mount Chimborazo in Ecuador is just over 6,000 meters above sea level -- it's almost two kilometers shorter than Everest with respect to sea level. But this mountain is near the equator -- on top of Earth's equatorial bulge -- so Mount Chimborazo's peak is more than two kilometers -- over a mile -- farther than the top of Everest from Earth's center .

Women in Science

Astrophysics and Space

Human World

JB: It might seem strange that the solid Earth beneath our feet has a bulge. But below Earth's crust, our planet is mostly a hot, semi-solid with the consistency of thick pudding. If you could place the whole Earth on a big flat floor with as much gravity as Earth's surface, our planet would collapse into a bubbling puddle of lava. Jenny, thanks for your question, and with thanks to the [National Science Foundation](#), we're Block and Byrd for Earth and Sky.

Author(s): David S.F. Portree

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More Information

The following individuals were interviewed for today's show. Our thanks to:

Dr. C. K. Shum
Associate Professor
Space Geodesy
Geodetic Science & Surveying
Ohio State University

Dr. Dennis Milbert
Chief Geodesist
NOAA, National Geodetic Survey

Author's Notes:

Mount Everest is 28 degrees north of Earth's equatorial bulge, so it can't take advantage of that natural lift in the way that Mount Chimborazo can. Mount Chimborazo isn't the only peak farther from Earth's center than Mount Everest. The smoking caldera of the Ecuadorian volcano Cotopaxi shares the honor, as does Mount Huascarán in Peru and Tanzania's Mount Kilimanjaro, the highest point in Africa.

Earth's shape

For all practical purposes, Earth is a sphere. If one measures carefully, however, Earth's shape is a flattened sphere, or an "oblate spheroid." Earth's rotation accounts for the slight bulge. The spin (nearly 1700 kilometers per hour at the equator) "throws out" Earth's middle, much as a merry-go-round will throw off an incautious child. Tides from the Sun and moon also stretch our planet, giving it a complex, shifting shape.

That implies a surprising degree of flexibility. Viewed from our home on Earth's crust, our planet seems solid and inflexible. Taken as a whole, however, it's a hot semi-solid with the consistency of pudding. If you could place the whole Earth on a big flat floor with as much gravity as Earth's surface, our planet would collapse into a bubbling puddle of lava.

Sea level & measuring from the center

This can be defined as the level of the ocean's surface; in fact it's a mean level taking account changes caused by tides. Most altitude measurements on Earth's surface are made using sea level as the standard and ignore distance from Earth's center.

Recent efforts to make direct spatial measurements of Earth's surface - such as the Shuttle Radar Topography mission - have measured from Earth's center of mass, however. Using the Global Positioning System (GPS) satellites for precise measurements also requires measurement from the Earth's center of mass.

Measurements of Earth's High Points (+/- 2 meters)

Mt. Everest (about 28 degrees north latitude) Height above sea level - 8463 meters
Distance of peak from Earth's center of mass - 6382.279 kilometers

Mt. Chimborazo (about 1 degree south latitude) Height above sea level - 6310 meters
Distance of peak from Earth's center of mass - 6384.459 kilometers (2180 meters farther than Mt. Everest)

Mt. Huascarán (about 8 degrees south latitude) Height above sea level - 6768 meters
Distance of peak from Earth's center of mass - 6384.372 kilometers (2093 meters farther than Mt. Everest)

Mt. Cotopaxi (about 1 degree south latitude) Height above sea level - 5896 meters
Distance of peak from Earth's center of mass - 6384.062 kilometers (1784 meters farther than Mt. Everest)

Mt. Kilimanjaro (about 3 degrees south latitude) Height above sea level - 5895 meters
Distance of peak from Earth's center of mass - 6383.955 kilometers (1676 meters farther than Everest)

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